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Progress Report On Cold Injured Citrus Groves

By—**A. F. CAMP**
W. L. THOMPSON
R. K. VOORHEES
W. W. LAWLESS*

The effects of a freeze on the citrus industry are determined as much by the weather before and after the freeze as they are by the temperatures during the freeze. Cool weather during January put the citrus trees into a very dormant state which enabled them to withstand low temperatures much better than might have been expected ordinarily.

Following the very low temperatures plenty of rain and very cool weather has helped tremendously in the recovery of the trees as well as helped to keep slightly injured fruit in good condition. Since it is near the end of February it has been considered in preparing this article that danger of severe cold is probably past, although the temperatures may be somewhat below normal for a time. Since it is impossible to prophesy the weather, these recommendations will have to be tempered with judgment to fit the situations as they arise.

Most of the groves have started growth and in most cases have been fertilized and cultivated to help that growth along. By the time this article reaches the citrus growers there will be very few groves in which growth has not started although some of the severely injured groves may still be dormant.

Those who have not already done so should now proceed with fertilizing and cultivating and to otherwise try to help the groves along the road

to recovery. Groves in which there developed little or no injury, or up to 20 per cent leaf loss, will need little variation from the usual practices, but trees with a heavy leaf loss and groves that are completely defoliated with some wood loss will require special attention with regard to fertilization and the suggestions given below should be given consideration.

Defoliated trees require a heavy replacement of leaves and often of wood, and the proper kind of growth cannot be produced by nitrogen alone. As a matter of fact the role of nitrogen in citrus growing in Florida has been greatly overemphasized in the past; short crops and poor grove conditions are not commonly due to nitrogen deficiency in Florida since this element has been liberally supplied but are commonly caused by deficiencies of several other elements and particularly copper, zinc, manganese and magnesium.

The deficiency of any one of these four elements has been responsible for far more grove ills than a lack of nitrogen, although the tendency is still to overemphasize the role of nitrogen and to make it appear as the only important fertilizer element. If defoliated groves have been well fertilized with all of the necessary elements and the soil kept at a high level of fertility, the use of a top-dresser now will give satisfactory results but should be followed with a well-balanced program later in the spring or early summer.

In groves that were showing evidences of deficiencies before the cold injury, the deficiencies will probably show up in an aggravated form in the new growth and unless supplied in some form the growth will be weak and the shedding of fruit heavy. The injurious results of the deficiencies may be even intensified if a heavy program of nitrogen fertilization is resorted to without supplying the deficiencies at the earliest possible date. All severely injured groves that showed evidences of deficiencies should have the needed elements supplied in the spring fertilizer program whether incorporated in a mixture or applied separately to the soil or in a spray.

The question of nutritional sprays becomes extremely important in injured groves and particularly in those which have been showing definite evidences of deficiencies. Badly defoliated groves that were sprayed with nutritional sprays just prior to the freeze can hardly be expected to show satisfactory results from the spraying since a considerable time is required for the leaves to absorb the required elements and transfer them to the twigs.

In all defoliated groves the young foliage should be frequently inspected to determine whether it is showing symptoms of any of the deficiencies, and if these appear sprays will offer a quick and feasible method of supplying zinc, copper and manganese.

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* Members of Staff of the University of Florida Citrus Experiment Station, Lake Alfred, Fla.

30 Days After The Freeze *By S. Lloyd Frisbie*

Last month a couple of days after the January freeze we wrote briefly of how we found things among Florida's citrus growers and of the fact that no one who might be considered able to render an authoritative prediction as to the extent of the freeze damage would venture such a prediction.

Since then we have travelled pretty much over the citrus area of Florida and today find, generally speaking, that the growers and the professional citrus authorities are still prone to refrain from drawing any rosy pictures of the situation, but that in the minds of virtually everyone with whom we talked they view the situation with what we would term a mental state of repressed optimism.

Casting about for the reasons for this largely unspoken but very definitely existent spirit of undercover optimism we do not find the cause too hard to find.

First, a large percentage of the early and mid-season fruit had already been moved to market when the cold weather hit us.

Second, while it is reported that citrus inspectors are being most severe in their inspections, a large percentage of the packing houses in the state are still operating and fruit is still moving to market — not in as large volume, as usual at this season of the year, it is true, but in quantities sufficient to dispel the original idea of some that the fruit crop was a "total loss."

Third, with the same close inspection prevalent, the canning plants are operating full blast, with plenty of fruit apparently suitable for canning still available.

Fourth, it becomes daily more apparent that Florida will have a substantial volume of Valencias available for market.

Fifth, while wood loss on a great many trees is now definitely apparent the tree loss due to the freeze will, it is authoritatively reported, be no greater, if as great as the loss of 1934.

Sixth, financial sources which have been supplying the growers with the money to operate their groves and raise their crops are offering complete co-operation with growers who will need additional funds to put their groves back into first class condition.

I should like to name the authority who went into considerable detail with me as to the reports which

he had gathered through his organization over the state, but he asked that his name be withheld. In any event he has seen disasters oftentimes before beset the citrus industry and as he summed up the situation as follows: "the growers of the state have undoubtedly faced severe losses, but those losses will be no greater than in 1934, and it may be that the freeze was a blessing in disguise. Proper attention given trees immediately should result in the setting of a good, if not a large crop, for next season, with a resultant increase in the price of good fruit."

According to another well informed citrus authority who had personally made a survey of the entire citrus growing area of the state Lee, Manatee and Pinellas counties were hurt the least by the cold, with St. Lucie and Indian River counties coming next in line. Polk and Highlands counties suffered somewhat more, with Lake, Brevard, Orange and Hillsborough showing still more damage.

According to this reliable informant Volusia county suffered the most.

One thing was most definitely evident throughout the entire citrus belt and that was that trees which were in a healthy condition suffered far less both in fruit and wood loss than did trees which were carelessly or improperly cared for.

The evidence of this fact should inspire Florida's citrus growers to a full realization of the need for keeping their trees in the best possible condition, not only from the standpoint of the production of better fruit but for the purpose of keeping them in the best condition to resist the cold.

In this issue Dr. Camp and his staff of the Citrus Experiment Station offer to the growers of Florida the very latest recommendations as to the treatment of cold damaged trees and since it was written on February 24 should be considered as applying to the situation as of the present moment.

Kentucky May Revise Limitation on Truck Loads

Florida citrus interests were watching closely developments in the Kentucky legislature in connection with a bill which would permit the passage over Kentucky highways of trucks weighing considerably more than the present limitation of 18,000 pounds. The initiative has been taken by the Florida citrus commission to have the new law enacted.

Truck shipment of Florida citrus to the territory north of the Ohio river and east of the Mississippi to a line drawn from Buffalo to Pittsburgh is practically prohibited because of Kentucky's present stringent truck limit law. Another factor of importance involves the inability of the Florida citrus industry to seek a better rail rate to that territory until competitive truck rates are established.

J. R. Crenshaw, secretary-manager of the Growers and Shippers League of Florida, testified before the motor transportation committee of the Kentucky lower house of the legislature a few days ago. His organization had been retained by the Florida citrus commission, which has been fighting to have Kentucky loosen its truck weight law for several

years.

Mr. Crenshaw in his testimony emphasized that Florida citrus trucks cannot and do not operate into or through Kentucky at the present time, except to a limited extent.

"Thus," he pointed out, "a great industry in one of your sister southern states is denied its rightful markets here and beyond here to the north, losing its right to other states further removed from you. The consuming citizens of your state and those of your sister states to the north are deprived of the opportunity of having fresh citrus fruits at a lower cost to themselves."

Mr. Crenshaw told the Kentucky legislators that 167,314 cars of citrus fruits, melons, berries and vegetables went into interstate commerce during the 1938-39 shipping season. With a crop of this magnitude last season and with thousands of acres of young citrus groves yet to reach their maximum, he said, "it can very readily be foreseen that as to citrus fruits alone Florida will within the next few years be faced with a much more serious problem of distribution than it has at present. Even now we

(Continued on page 15)

Dr. James H. Montgomery Passes Away In Gainesville

Dr. James H. Montgomery, quarantine inspector and assistant plant commissioner with the State Plant Board, died in a Gainesville hospital on the morning of February 16, and the state and the nation lost an outstanding agricultural worker. Stricken on the preceding evening, his sudden death came as a shock to his friends and fellow workers.



Dr. James H. Montgomery

Dr. Montgomery was born March 23, 1875, at Chambersburg, Pa. In 1898 he graduated in medicine from Jefferson College in Philadelphia. He served with distinction as a surgeon in the United States army during the Spanish-American War in 1898 and 1899.

He brought his invalid father to Florida about 1902, and became interested in growing avocados and other sub-tropical fruits. He and his father formed the Montgomery company and acquired and developed extensive properties in southern Dade county.

The dreaded disease, citrus canker, appeared in Dade county in 1913 although at that time its destructive nature was not well known. During the next two years it began to wreak havoc with citrus trees and threatened the state's citrus plantings with destruction. From 1913 to 1916 Dr. Montgomery gave freely of his time in working with growers in an effort to stem the destruction, and ren-

dered valuable voluntary service in the cause of citrus canker eradication.

The State Plant Board of Florida was established in 1915 and undertook the job of canker eradication through burning of all infested trees, the only known method of getting rid of the disease. Since Dr. Montgomery had proven such a valuable volunteer in the work, and a good diplomat, he was employed by the Plant Board in March, 1916. His first service was a "trouble shooter."

Except for a short interval, Dr. Montgomery had been with the Plant Board since early 1916. He was appointed quarantine inspector on May 10, 1918, and on Feb. 14, 1921, was given the additional duties of assistant plant commissioner.

During his 24 years with the Plant Board he had guarded the state's agricultural crops against the introduction of destructive pests not already found in the state. In addition to the canker eradication campaign, he played an important role during the eradication of the Mediterranean fruit fly in 1929-30.

His intense interest in plant board work, and his outstanding record, had caused him to be regarded as one of the outstanding authorities in plant quarantine in the United States. At the time of his death he was one of two Southern members of the National Plant Board. From 1931 to 1937 he was secretary-treasurer of the Southern Plant Board. In 1939 he served as president of the Florida Entomological Society.

Dr. Wilmon Newell, plant commissioner who has worked side by side with Dr. Montgomery for 24 years, paid him a very high tribute. "Quiet and unassuming, he was a very ardent worker in protecting Florida crops. He lived his job," said Dr. Newell.



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PETTEWAY UPHOLDS CITRUS LAWS

In a decision handed down by Judge Petteway of Lakeland, the Florida maturity and inspection laws regulating the shipment of citrus fruit were upheld.

Suit was brought in the names of 276 citrus growers of Polk, Hardee and DeSoto counties who attacked the constitutionality of the several restrictive laws passed by the last session of the Florida legislature and sought to enjoin Commissioner of Agriculture Mayo from enforcement of the regulations.

Florida's inspection and maturity laws may not be perfect, but they represent the best thought and the mature deliberation of the great body of citrus growers of the state, both large and small, and in operation have served to protect the interests of the growers who, prior to the enactment of those laws, found themselves at the mercy of conflicting interests and without redress under the law.

If the laws about which the 276 growers complain are inadequate, if they work a hardship on any group of growers, if they are inimical to the best interests of the industry as a whole, the remedy should properly be sought at the hands of the state legislature. But until the laws as they stand have been proven to be unwise, they should be enforced with vigor. As we see it, never has there been greater need for strict enforcement than at the present time when the industry stands in need of every possible aid to protect the good name of Florida fruit and to guard the interests of the growers. This is no time to let down the bars or open the door to indiscriminate shipment.

AFTERMATH OF THE FREEZE

Thirty days after the "freeze of 1940" it is possible to more accurately judge of the damage to Florida's citrus crop and trees, although the full extent of the damage is still somewhat problematical.

While it is evident that the actual damage to fruit and trees is less than first appeared, there can be no doubt that the industry has suffered severely. In some sections the injury has been comparatively slight, while in other localities the damage to fruit, particularly that portion of mid-season varieties remaining on the trees, was almost total.

General opinion among growers, shippers and others connected with the industry is that the

federal estimate of 11,600,000 boxes of damaged fruit is extremely conservative. Most private estimates place the damage much higher.

Tree injury is likewise the subject of varying estimates. Some sections appear to have escaped with no injury to trees, even the tender growth apparently having been undamaged. Other localities report considerable tree damage, but on the whole, trees appear to have come through in better shape than in the freeze of 1934, although lower temperatures were registered this year. The fact that trees were dormant at the time of the cold visitation saved the groves from much greater loss.

While there is no disposition to minimize their loss, Florida citrus growers are going about the work of rehabilitation with a spirit of determination which is characteristic of the industry. In their efforts to repair the damage and rebuild their groves, growers are receiving the cooperation of financial and allied interests and are viewing the future through brighter glasses than a month ago.

"SMALL GROWER" LAUDS HOLLAND

Elsewhere in this issue The Citrus Industry presents a communication from Mr. W. L'E. Barnett, who styles himself a "small grower" and who voices his approval of the maturity and inspection laws and the bond and license laws enacted by recent sessions of the Florida legislature. The field box law also comes in for his approval. Through the operation of these several legislative enactments, Mr. Barnett says that he, in common with other growers, has profited.

Declaring that he has watched with interest the reports of special legislative committees and the treatment accorded grower delegations at Tallahassee during the last three or four sessions of the legislature, he says:

"It has been my observation that no other man has worked more arduously for our cause than has Senator Spessard L. Holland of Bartow. When the going was hard he was never swerved from the course that he honestly felt would lead to better conditions for the grower. His ability and past record in the Senate prove conclusively what he could do for us if elevated to the position of Chief Executive of Florida, therefore it would serve the growers' interest to elect him our next governor."

We believe that Mr. Barnett voices the sentiments of the majority of Florida citrus growers in his endorsement of the attitude of Senator Holland.

In this issue, the specialists in charge of work at the Florida Citrus Experiment Station at Lake Alfred recommend treatment for freeze damaged citrus trees. These recommendations are based upon long experience and careful study and should be read by every citrus grower whose trees were injured in the recent cold spell.

A frost injured tree is a weakened tree. It needs building up by careful nursing and proper feeding.

PROGRESS REPORT ON COLD INJURED CITRUS GROVES

(Continued from page 5)

ganese. If the symptoms are mild and the growth vigorous, it may be desirable to wait until the foliage has hardened and supply the needed elements in connection with a melanose spray, but if they are acute it may be desirable to apply a spray containing the needed elements to the young leaves after they are about one-third grown.

If copper is one of the needed elements to be used in this spray, it will be desirable to use a neutral copper instead of bordeaux on very young foliage in order to reduce the possibility of burn. Spraying trees that have been heavily defoliated before the new growth comes out is not satisfactory because these elements are not rapidly transferred from foliage in one part of the tree to twigs in another and also because the area of leaves left for absorption is too much reduced. Both copper and zinc deficiencies and to a lesser extent manganese deficiency influence the holding and setting of young fruits and when any of these are found to be deficient their application will be found necessary to retain the maximum possible crop.*

It should be noted with regard to nutritional sprays that startling results in the way of growth and yield following such sprays are associated with a deficiency condition and where these elements are present in requisite amounts no great results can be expected from the sprays. Nutritional sprays have been used so often with spectacular success on deficient trees that many have ascribed to them almost supernatural powers which are not justified in fact. Such sprays are very satisfactory for the quick correction of deficiencies with consequent increase in yield and growth but will not materially aid the trees that are already well supplied with these elements.

One final caution with regard to fertilizer treatments on severely injured trees is not to try to force them too rapidly. This caution is necessary because it is not possible as yet to be sure just how much of the wood has actually been killed, and heavy applications of fertilizer may be wasted if the trees have to be heavily pruned. Such severely injured trees should be nursed along with frequent applications of small amounts of fertilizer and care used to see that all deficiencies are supplied.

* Directions for the mixing and use of nutritional sprays may be found in the footnotes of the 1940 Better Fruit Program of the Florida Citrus Commission.

The effects of the freeze on insect problems are being closely followed by workers at the Citrus Experiment Station and a few notes will be given here to bring the situation up to date. The cold itself did not kill any great number of rust mites but completely defoliated trees have greatly reduced infestation as a result of leaf dropage. In cases of partial defoliation however, the mites have migrated to the uninjured leaves so that the infestation on the remaining leaves in many groves is extremely heavy.

With migration of mites to new leaves this infestation will be somewhat diluted but still heavy. Where heavy infestations are present in partially defoliated orange groves it will probably be desirable to spray immediately with a 1-70 lime-sulfur plus wettable sulfur if clean fruit is desired. Waiting until the melanose spray to apply sulfur on oranges is going to result in early rust mite injury, a condition that is not noticeable until the fruit matures.

A good sulfur application now, followed by a melanose spray with sulfur in it at the proper time and an oil spray in early June should carry the grove to late summer without additional spraying for rust mites if the spraying is properly done. This dormant or semi-dormant sulfur application will be important where large acreages of partially defoliated groves must be handled with limited equipment.

There has been a rather high mortality of red scales and some delayed mortality in purple scales is taking place, notably in the eggs. The heaviest loss in scales however is through the shedding of leaves and when groves have infested foliage left in them there will be sufficient scales left to start an infestation. Purple mites have been somewhat reduced by the heavy rains which washed many of the mites off defoliated twigs. This may result in a somewhat delayed infestation but will not eliminate this hazard.

There is no appreciable mortality of whiteflies so far and the usual trouble can be expected from these insects. In groves where there was complete defoliation there will be a big reduction in purple mites, red scales and whiteflies due to the leaf loss but purple scales will persist on the twigs and transfer to the new foliage.

It is impossible to give much information on the disease situation at the present time. Examination of cold injured wood shows that it is rapidly becoming infected by the withering fungus and considerable dying back

of defoliated and slightly injured wood can be expected from this source. Very little evidence of the melanose fungus has been found so far and no fruiting bodies are developing as yet on wood killed by the freeze.

Until the fungus develops on wood killed during the freeze the question of protecting the young foliage against infection in order to aid the recovery of the tree will hinge on the amount of dead wood previous to the cold. An attempt is being made to keep abreast of this situation and to advise through the press when spores from the wood killed during the freeze may be expected.

In the meantime it may be desirable to use a copper spray on the young foliage in groves which contained considerable dead wood prior to the freeze, but this will vary with conditions. The timing of the melanose spray may be affected somewhat by the appearance of spores from newly killed wood but this will have to be determined later and growers will be advised through the press.

This discussion of grove practices following the recent cold period is meant as a progress report and not necessarily as permanent recommendations to be followed after cold injury occurring during some other year under different conditions. Further study is being made of the injury as it develops and the results of various cultural practices in injured groves.

Okloosa County farmers have placed orders for 1,000 red cedar seedlings for planting on their places, according to County Agent Hentz.

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Small Grower Discusses Citrus Regulations And Florida Governor's Race

Mount Dora, Fla.,
February 24, 1940

Mr. S. L. Frisbie, Editor,
The Citrus Industry,
Bartow, Fla.,

Dear Mr. Frisbie:

Your magazine has always seemed to be interested in the welfare of the Florida citrus grower, and as one of the so-called "small growers" of Florida I would like to express my views regarding the benefits we have derived from some of the recent laws and regulations governing our industry.

I have always felt that the shipment of green and low grade fruit has prejudiced the trade and the ultimate consumer against our product in former years but now that we are operating under new maturity standards this condition has been vastly improved. That this condition may be obtained, it is quite necessary that adequate inspection be made of all fruit moved to market regardless of whether it is packed in a large plant or an humble packing shed; also whether it is moved in standard boxes, bags or in bulk. However, further improvements in the regulations must be made.

Now I feel fully assured that when I contract the sale of my fruit that I will get my money since our new Bond and License Law forces all shippers who buy fruit to post a substantial bond protecting me and other growers against unscrupulous dealings. In fact, when a shipper violates the terms of this law, his license is cancelled thereby forcing him out of business.

Undoubtedly the practice of artificially coloring fruit was badly handled in many instances until recently. Personally, I am unalterably opposed to any form of artificially coloring, but recent laws applying to the coloring and processing of fruit have helped this situation immensely. This more rigid control has meant added

profits for me.

The field box law will assure the grower who sells his fruit on the tree of a square deal. No more oversize boxes can be used without being stamped as such.

None of the aforementioned benefits to the grower would have been possible without proper legislation. Our laws are not considered perfect and we are not getting as much money for our fruit as we want, but these laws have helped.

As our volume increases, it is absolutely necessary that we regulate our industry so as to increase demand for our fruit thereby keeping us in business at a profit. A few years back when Florida produced ten to fifteen million boxes, conditions were different. Today we are producing about 50 millions with a corresponding increase in other producing areas.

During the last three or four sessions of our state legislature I have watched with interest the reports of special legislative committees and the treatment accorded grower delegations at Tallahassee sponsoring citrus laws.

It has been my observation that no other man has worked more arduously for our cause than has Senator Spessard L. Holland of Bartow. When the going was hard he was never swerved from the course that he honestly felt would lead to better conditions for the grower. His ability and past record in the Senate prove conclusively what he could do for us if elevated to the position of Chief Executive of Florida, therefore it would serve the growers interest to elect him our next governor.

Very truly yours,
W. L'E. BARNETT

The two communications reproduced on this page are among several received this month. As space does not permit our using all of them we are presenting these two because of their general interest to our readers.

Early Maturing Seedless Grape- fruit Discovered

Orlando, Florida,
February 7, 1940.

The Citrus Industry,

Bartow, Florida.

Gentlemen:

Four years ago I discovered an early-maturing type of grapefruit which was seedless, very juicy and of fine flavor by the first week in October. The fruits were larger upon the average than Marsh Seedless grapefruit, running 60 to 70's with few of smaller size. I have checked the performance of this fine tree each season since, finding it behaves similarly each year. Fruit can be eaten without sugar during early maturity and begins to deteriorate by March, differing markedly in comparison with late carry characteristic of Marsh.

I noticed something different about the fruit which I could not figure out, which attracted my attention to the lone tree, and upon cutting was agreeably surprised to find its fruits seedless, many entirely seedless. It was found among a planting of Valencia budded on grapefruit rootstock, and presumably Valencia bud had perished and seedling grapefruit allowed to grow. I have not checked the root to prove my assumption, but believe this to be the case.

The variety may prove worthy of propagation due to the excellent size of the fruit, and remarkably juicy character so necessary in the early part of the deal.

I have top-worked old trees with buds from the original tree and budded a few on various rootstocks for trial in an endeavor to produce something outstanding and fine in an early grapefruit, and there is no reason to believe buds should differ in behavior from that of the parent. Shippers who have eaten the fruit from hand in October have stated it was superior to any grapefruit of early maturity yet sampled.

Anything to improve our groves would surely be welcomed by most of us and I am hoping the buds prove a success.

Yours truly,
DONALD J. NICHOLSON,
1218 Greenwood Ave.



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Spring Fertilization In Lake Demonstration Groves

BY R. E. NORRIS
LAKE COUNTY AGRICULTURAL AGENT

Citrus growers, like their brethren who till the soil for other crops, are constantly faced with some kind of problem. Some of these are simple, while others are complex. The one that growers are faced with now undoubtedly falls into the latter category, for although the grower knows he is faced with a serious problem, just how serious it is he has yet to determine.

The cold spell through which we passed recently was unique in several ways. It came on slowly and it eased off slowly. And it was severe during its peak. Because temperature rose gradually after the coldest point reached, the grower still cannot definitely say how much of his fruit was damaged, although the warm weather a few days after the freeze and the rain which fell generally over the citrus area made fruit show up cold damage to a considerable extent.

And for the same reasons that he cannot determine the amount of damage to his fruit, he still cannot determine definitely the extent of damage to the trees. The cold came on slowly, so there was very little sap left flowing in the trees and for that reason there was very little split bark that he could find in his grove. But he knows that in some areas it got awfully cold and that the cambium layer, which is the life-line of the tree and its branches, is located just under the bark of the tree and that it is subject to cold injury. Past experience has taught him that big branches can have a relatively small area of the cambium layer injured by cold, and that this big branch may even send out new growth and put on a large crop, only to die in a few weeks or months, or even a couple of years later, as the result of the injury to the cambium layer that he could not see with his eye.

Further, the grower observed that the ground was frozen in many parts of the citrus belt and in situations where the tender feeding roots were close to the surface of the ground those roots, it is reasonable for him to suspect, were injured. And not until growth starts will this condition make itself known to the grower by affecting the vigor and amount of new growth and by the manifestation of mineral deficiencies, especial-

ly zinc and copper. So the citrus grower doesn't know just where he is and all he can do is to carry out a good common sense program — one that will be economical and at the same time fit most any condition.

Where the ground is dry and irrigation facilities are available the trees should be given a good soaking because the tissues have become completely dried out as a result of the cold and they must have moisture before they can function properly.

Pruning should be delayed. The old theory that sour sap will back up into the living tissue and kill it has been long ago discarded. If we are in too great a hurry to prune out dead wood now we may cause more injury than the cold did because we might prune away living wood, or, in this case, we might not prune sufficient dead wood, in which case we would have the job to do over again. It is impossible to tell exactly how far back the wood has been injured and until growth starts this cannot be very definitely determined. From four to six weeks after growth starts will be soon enough to prune young trees. Older trees carrying a crop may have to wait until the following winter to

be pruned because ladders and pruning implements may interfere with the new crop. When pruning, cut a half or three quarters of an inch beyond the end of the dead wood into the living wood. Cuts over three fourths of an inch in diameter should be treated with tree paint.

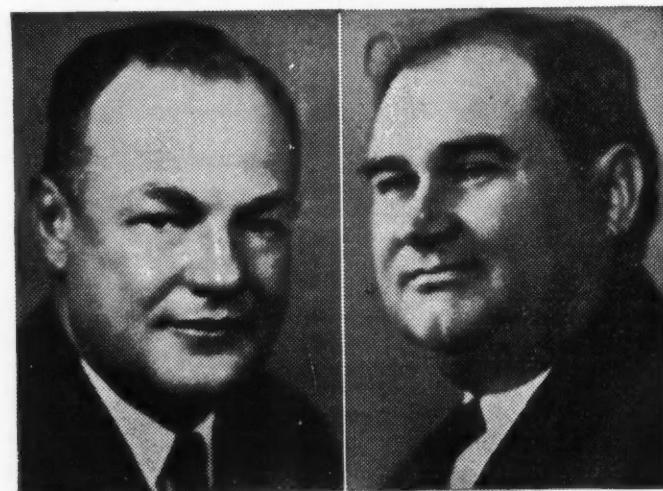
Trees that have been killed to the ground should be cut off even with the ground surface. They will send up new growth which may be budded or grafted at a later date.

As we have mentioned previously, growers should be on the look out for the presence of mineral deficiencies after the new growth starts. These deficiencies are quick to show up in the grove after set backs such as freezing weather and the tree's comeback will be more rapid and more satisfactory when the mineral elements are supplied. Copper and zinc deficiency symptoms probably will be the most noticeable.

With the first warm rain or several days of warm weather the trees are going to respond by sending out a growth. If fertilizer was applied within the last sixty days there is probably little use in applying more now. If it was not, however, an ap-

(Continued on next page)

New Aides In U. S. Agricultural Department



CLAUDE R. WICKARD

GROVER B. HILL

Wickard, the newly appointed Under Secretary of Agriculture, has been an active farm operator in Indiana, while Hill named as Assistant Secretary of Agriculture has been a Texas rancher since 1901.

**SPRING FERTILIZATION IN
LAKE DEMONSTRATION GROVES**

(Continued from preceding page)

plication of soluble nitrates, ammonia or a good top dresser should be applied when the new growth starts.

Several methods of grove fertilization will be carried out in Lake County demonstration groves this spring.

In bearing groves, in instances where the cold injury is severe and the crop will be small, growers will apply sulphate of ammonia at the rate of 1/5 pound per foot of normal tree spread or sodium or calcium nitrate at the rate of 1/4 pound per foot of normal tree spread. (By normal tree spread we mean the tree spread before it was reduced by cold). Sulphate of ammonia will be disced into the soil in all cases, but whether or not the nitrates will depends on soil moisture conditions. If the soil is dry the grove will be disced, but if the soil is moist discing will be omitted, or will be deferred until time to disc for the cover crop seed bed — if a seeded cover crop is to be grown.

The secondary plant foods will be added in these groves, mostly in the form of sprays, as the deficiency symptoms appear. It is especially important, in groves falling in this group, that as economical a program as possible be carried out, since it will be at least two years before they are back in production.

In groves where the injury appears to be limited so that the grove will produce a crop in 1940 a top dresser analyzing 14-0-14, 12-0-14, 10-0-10 or a similar analysis will be used. These formulas will in most cases, contain copper, zinc and manganese. However, a number of groves receiving a top dresser will be sprayed with a nutritional spray as outlined in the spray and dust schedule of the Florida Citrus Commission.

Magnesium, which is deficient in most Florida grove soils, will be applied in Lake County demonstration groves in the form of dolomitic limestone during the summer months, or by the addition of soluble magnesium added to the mixed fertilizers in June.

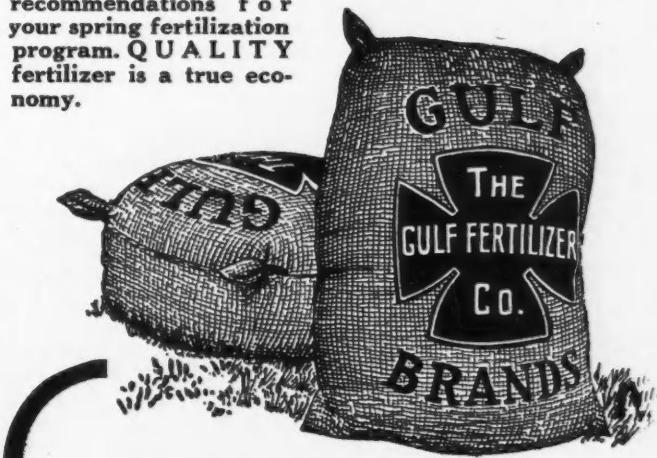
Growers will be well advised to study their grove management program well. A study of Extension Service Miscellaneous Publication No. 28 "Citrus Costs and Returns" by R. H. Howard, will point to a number of ways in which grove expenses may be reduced. Some of the most noticeable of these include keeping the number of times you cultivate to a minimum, avoid hoeing old bearing trees, supply the secondary plant foods when they are needed.

PROOF that good grove care PAYS!

ONE of the outstanding facts to be observed after groves have been subject to unusual weather shock is that well cared for groves come through with less loss or damage.

This year's "freeze" again presents proof on every hand. Groves that have had the right plant foods in the right amounts at the right time, are in better condition to produce next year's crop than those which have been underfed.

Regardless of what happens to fruit on the tree, the grower who protects his trees by giving them the vital energy needed to withstand weather shocks, is protecting his grove investment. GULF Brands of complete, balanced fertilizers play an important part in better grove care. Now is the time to have the GULF Field Man in your section go over your grove and make sound recommendations for your spring fertilization program. QUALITY fertilizer is a true economy.



GULF *Brands of*
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THE GULF FERTILIZER CO.
TAMPA and PORT EVERGLADES, Florida

Aphids On Citrus....

It does not seem likely that the green citrus aphid is going to be particularly troublesome this spring. As a result of the several freezes recently, there will doubtless be a heavy dropping of the leaves from the citrus trees. These trees, of course, will be putting out new growth as soon as the weather warms up.

In most sections of the state aphids are now very scarce, due not only to prolonged cold but also to the drouth of the early winter. There are very few left to start an infestation, very few left for seed, so to speak. It does not seem at all likely that even with the rapid breeding they are capable of that they can build up a heavy infestation before the spring growth can harden in those sections of the state badly hit by cold. In some of the more moist, warmer sections of the state there are some aphids at the present time and growers in these regions will do well to begin their fight against aphids at the present time, if they have not already started.

Aphids begin to have young when only six days old, and their average reproduction when conditions are favorable is six young per day. Have you ever stopped to figure what this means? It means that a female, and they are all females in the citrus belt, at the end of a week could have 42 daughters and 36 granddaughters. At the end of two weeks, in her middle age, she could have 84 daughters and 1,396 granddaughters and 648 great granddaughters. In her ripe old age, at the age of three weeks, she could have 2,000 granddaughters and 7,776 great granddaughters, a total of nearly 10,000 descendants; and at the end of ten weeks there would be living to revere her memory 160,000 descendants. This is supposing, of course, that none died except from old age and there was plenty of food. As a matter of fact no such rapid reproduction takes place in nature but it does emphasize the immense possibilities for reproduction if conditions are favorable. Like other insects, aphids have their enemies, predators and parasites from which they cannot run away and from which they make no attempts to run away. They show no fear whatever of their most deadly enemies. Their methods of getting along in the world is to breed so fast that after their enemies have had their fill, there will be a few left to carry on the species. Among these

enemies are ladybeetles, aphid lions, and especially certain fungus and bacterial diseases which often sweep them off in great numbers, but this does not usually happen until late in the spring.

Citrus growers all know, of course, what damage aphids can produce. If abundant enough they may absolutely stop all development of the spring flush of growth, including blossoms and fruit. The curled leaves are but one phase of the destruction they produce.

It is only on the spring flush of growth that aphids are usually a serious menace. If we can protect this flush of growth from the aphids we can afford to ignore them the rest of the year. Therefore it is an excellent insurance to take measures at the present time to delay the infestation. What few colonies there are in the groves at this time should be destroyed. They are mostly out on the ends of slender branches, which may be bent over into a bucket containing some good insecticide, like nicotine with soap or other spreader. Twigs which cannot readily be bent into a bucket can be spot dusted. For this purpose chose a time when there is absolutely no wind and the temperature is above 60 degrees F. Dust all colonies with a 3 per cent nicotine sulfate-lime dust. This will be very effective if weather conditions are suitable. There is no use dusting in the wind. Even enough wind to sway the Spanish moss in the trees is too much to get a good kill of the aphids by spot dusting.

If one is to control aphids he must do a thorough job, more thorough than is ordinarily done for other citrus pests. For instance, in checking up behind a spray crew in citrus groves you will usually find about 85 per cent of the foliage and fruit has been covered. This is an average commercial job. If we do no better than this in the control of citrus aphids let us stop and consider what happens. Fifteen per cent of them are left alive, 15 out of every 100. Let us say that half of these are mature females bringing forth young at the average rate of six per day. It will readily be seen that in 48 hours the 15 aphids which escaped will have reproduced the original 100, provided they are not hindered by predators and parasites. In other words, the average commercial spraying such as is usually done for scale insects or rust mites, would check the de-

BY J. R. WATSON
ENTOMOLOGIST
FLORIDA EXPERIMENT STATION

velopment of the aphids only about two days. As a matter of fact, of course predators will take care of some of the 15 aphids left, but at most such a spray job will hardly check development for more than a week.

A most excellent way to deal with aphids on young trees, and it is on young trees that aphids always get their first start, is to construct some tents of unbleached muslin stretched over a framework of telephone wire. A battery of a dozen of these tents will be sufficient to keep two men busy. By placing these over the trees and dusting into them through a hole our average kill has been 99.6 per cent. Only four out of 1000 escaped instead of 150 as in average spraying. In other words, for purity we have beaten Ivory soap by 2 points. With this percentage of kill the spring flush of growth will be over before the four aphids which are left will be able to reproduce the original 1000.

One other important thing a grower

(Continued on page 18)

COPOFILM

"The Modern Copper Fungicide"

Controls Scab and Melanose

Corrects Copper Deficiency

Offers a high margin of safety and leaves a minimum of insect breeding residue.

The Cost Is Low!

JACKSON GRAIN CO.

Tampa Florida

Agricultural Census Of Interest To Citrus Growers

Statistical information of great importance to the citrus industry will be compiled by the federal census which starts April 1 in rural sections. As a result of this census, the first accurate estimate in five years of the number of bearing and non-bearing citrus trees will be available.

A special set of questions on citrus fruits is contained on the tabulation sheet which enumerators will take with them in canvassing the agricultural situation in Florida. Grove owners will be asked to report the number of bearing and non-bearing trees they have of early and midseason orange groups, late or valencia type oranges, seeded grapefruit and seedless grapefruit, tangerines. The census will enumerate separately the less common varieties such as lemons, limes, satsumas, mandarines and other miscellaneous kinds.

The total value of all fruits and nuts grown on each farm also will be tabulated.

The enumerators will ask the number of field boxes harvested during the 1939-40 season from the bloom of 1939. While the current season may not be completed at the time the enumerator calls, it was felt growers would know in April approximately how much fruit they would have marketed and available for marketing. Such an estimate, it was felt, would probably be as accurate as the estimate of what actually went to market during the 1938-39 shipping season, and would be more recent.

Census officials are hopeful growers will cooperate with enumerators in furnishing desired information without delay. It is hoped 1500 enumerators employed in Florida can complete the agricultural phase of the census in 30 days. If this is done, the reports will be forwarded promptly to Washington and tabulations completed and announced before the start of the 1940-41 shipping season.

The last government census of citrus in Florida and other states was made in 1935, and it is recognized that much additional acreage has been planted since that time. While the new enumeration does not contain a question as to acreage of citrus trees, this can be accurately estimated once the number of trees is known.

A few sample copies of the farm schedule to be used in the coming census are available at the Florida citrus commission offices, Lakeland, and will be sent those requesting them as long as the supply holds out. Growers with extensive holdings might find it helpful to obtain this sample copy before the enumerator calls and have the answers ready.

KENTUCKY MAY REVISE LIMITATION ON TRUCK LOADS

(Continued from page 6)

(Continued on page 5)
are seriously handicapped by a lack of distribution in the smaller cities and towns of the country. Within recent years motor truck transportation has done much to relieve the situation. Trucks can come into our state, purchase fruit and distribute it to the smaller towns and villages that do not have the advantage of other modes of transportation; or shippers, many of whom own their own trucks, can distribute fruits to

(Continued on page 18)

Will Your Trees Recover Quickly?

To grow healthy, new foliage, bloom, and set a real crop your trees need quickly available Nitrogen and Calcium.

In a word . . .

Calcium Nitrate

(Nitrate Nitrogen and Water-soluble Calcium)

Jackson Grain Company

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CALCIUM NITRATE**

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TENNESSEE BASIC SLAG**

For sale by dealers throughout Florida

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Department

COMPILED BY THE LYONS FERTILIZER CO.

NOW THAT THE FIRST SHOCK of the recent cold spell has worn off a fairly accurate estimate of the damage to Florida citrus may be had, with the result that while admittedly there has been much damage done the outlook is decidedly less black than was the case a month ago.

We will not seek here to say which of the numerous and varying estimates of fruit and tree damage are most nearly correct, but it is certain that citrus trees are in need of the most careful attention right now.

Casual observance of the trees affected by the cold weather has demonstrated all over again the fact that those trees which were in a healthy well-cared for condition suffered far less than trees which had not been adequately and properly fertilized.

Bemoaning our losses is going to get us nowhere. Each of us has an individual problem to solve right now — the problem of getting our trees in condition to put on the best possible bloom and to set the best possible crop of fruit for the forthcoming season.

Money, as always in any business is a major factor, and the numerous sources of supply of this very essential commodity have indicated their desire to co-operate with the growers who need additional funds to put their groves back in bearing condition.

Dr. Camp of the State Experiment Station, and other reliable authorities have prescribed the proper treatment of trees affected by the cold while staff field men of our company and other recognized fertilizer companies are playing a most important part in tendering counsel to growers who seek it.

So now, as always, Florida growers are working hard and looking ahead to the next crop with persistent optimism having relegated the freeze into history, as is the wise custom of the members of Florida's outstanding industry.

W. L. WARING, JR.,
President & General Manager

ADVERTISEMENT — THE LYONS FERTILIZER CO.

SUGGESTIONS FOR FARM AND GROVE CARE IN MARCH

Prepared by Horticultural Department Lyons Fertilizer Company

CULTIVATION

Practically all groves in the state are beginning to put out a flush of growth. Thorough cultivation at this time will stimulate the trees and help develop the growth and bloom.

FERTILIZER

Make application of fertilizer to all trees just as soon as is possible. Trees have suffered a shock from the recent freeze, and an application of fertilizer at this time will be of much benefit in developing new growth and the bloom. Be sure and use a mixture that contains ample amount of readily available nitrogen along with slower feeding materials and plenty of potash to develop quality wood. The Lyons Field Man will be glad to consult with you regarding fertilizer to be applied at this time.

PEST CONTROL

It is very advisable to keep a close check on all diseases and insects following the cold weather. There is a Lyons Field Man in every territory that is well posted and will be in position to advise with you regarding proper procedure in controlling these pests.

PRUNING

Forget about all pruning for a few weeks until after we are able to determine just how much wood will have to be removed from the tree. When pruning is started be sure and remove all dead wood.

NUTRITIONAL SPRAYS

It will be well to watch foliage for symptoms of mineral deficiencies and apply the proper nutritional or corrective sprays on early oranges and grapefruit as soon as petals have fallen. On valencias this spray can be added in a later lime sulphur application.

The fellow who philosophizes that the best way to have your grove take care of you is to take care of your grove really had something, it seems to us.

Notes Made After The Freeze

FRUIT CAN BE SAVED BY FIRING! However, this is not an easy job, but it can be done if you have plenty of wood and manpower to keep a roaring fire burning as long as the temperature is low enough to be dangerous. A very good example of this statement is that of the Joe Knight grove near Elfers. His valencias are in perfect condition as a result of firing.

In making preparations to fire a grove it is very important that enough wood be placed in the grove or on the premises to fire over a period of four successive nights. We know of a number of groves that were fired two nights with good results, only to have the wood give out and the fruit being lost the following night.

The recent freeze should be sufficient evidence to convince anyone that it is real economy to keep the grove in tip-top condition. If you ride over the state you will quickly notice that trees improperly cared for are the ones that suffered most from the cold. Trees in good condition as a general rule suffered little.

Indications are that we will have a light crop of fruit next season. Now is the time to give thought to producing real quality. Use a good fertilizer and keep all diseases and insects under control.

Weather conditions have been most favorable since the freeze, and during the past few days we have noticed that valencias showing only slight damage are beginning to develop and fill out damaged spots. Fruit that has been severely damaged will not come back.

The staff of the Citrus Experiment Station recently published a very interesting press bulletin (Press Bulletin No. 546) regarding the care of the citrus grove that was injured by the cold, and it would be well for every grower in the state to obtain a copy of this and read it very carefully.

Little Bits

of
FUN

Saint Peter — How did you get up here?

Newly Arrived Spirit — Flu.

A young bank clerk proposed to a modern girl the other night.

Darling, he wound up anxiously, you could live on \$15 a week couldn't you?

The girl laughed.

Yes, she said, but no longer.

Judge — You know the law presumes you to be innocent.

Culprit — Then why all these elaborate preparations to convict me?

Little Boy — Mother do cows and bees go to heaven?

Mother — Why, child what a strange question? Why?

Little Boy — Because, if they don't the milk and honey the preacher said was up there must be all canned goods and I've had enough of such things.

A minister was consoling a widow upon the loss of her husband. He spoke to her about the virtues of the deceased, ending with the remark: "You will never find his equal."

The widow answered sobbingly, "Maybe not, but I'll do my best."

Doctor — How's your cold, Mr. Jones?

Jones — It's very stubborn, Doctor.

Doctor — How's your wife?

Jones — Oh, she's about the same.

Willie — I'm not going to that damn school any more.

Poppa — Willie, where did you learn such a word?

Willie — William Shakespeare used it.

Poppa (menacingly) — What did I tell you about running around with those toughs?

KENTUCKY MAY REVISE LIMITATION ON TRUCK LOADS

(Continued from page 15)

those smaller communities."

After describing the territory lost to Florida citrus because of Kentucky's virtual barrier on trucks, Mr. Crenshaw pointed out that in that area are located such large fruit auction markets and consuming centers as Chicago, Cleveland and Detroit, and hundreds of smaller cities, towns and villages, that could and would annually take several million boxes of Florida fruit at prices the consuming public could afford to pay, and which "at the same time would return a profit to our growers and shippers if we were favored by a more liberal size and weight law."

Mr. Crenshaw estimated that a profitable pay load could not be hauled on a truck with a weight limit of less than 30,000 to 32,000 pounds. The bill under consideration also would increase the length limit of trucks from 26 to 28 feet and the total truck and semi-trailer limit from 30 to 35 feet.

Kentucky and Tennessee long have proved difficult states for citrus truckers, although Tennessee some time ago raised its weight limit to 24,000 pounds, which has helped considerably.

Among others who testified in favor of the Kentucky bill was the assistant attorney general of Kentucky who stated it would produce considerably more revenue than the present law, and an engineer of the U. S. Bureau of public roads, who said it would place truck weight, height and length limits more in line with other states and that it would impose no additional hardships on the roads because of greater weight.

The citrus commission approximately two years ago filed suit for an injunction to force Kentucky to raise its truck weight limits, but before a hearing could be held the United States supreme court reversed a three-judge federal court which had upheld such an injunction granted in South Carolina. This demolished the commission's case in Kentucky and the litigation was stopped.

APHIDS ON CITRUS

(Continued from page 14)

er can do to protect his spring flush of growth from aphids is to push the growth as rapidly as is practical by fertilizing and cultivating his grove. We have never had a severe freeze after the middle of February

THE CITRUS INDUSTRY

March, 1940

in the main citrus belt of Florida, so apply the spring fertilizer and start cultivating the grove by that time. Push out the spring growth on the trees and get it full grown and hardened up before the aphids begin to fly generally. As has been pointed out before, from the standpoint of their ability to migrate there are two forms of aphids, the winged and the wingless. When the flush of growth has just started in the spring and there is an abundance of food, only about one aphid in ten ever develops wings. The result is that the majority of them cannot move except by crawling from one branch to another so that their ability to migrate is practically limited to the tree on which they were born. But when the growth begins to harden up on the trees 90 per cent of the aphids may develop wings and if the growth on that particular tree is no longer suitable they will fly away in all directions looking for suitable food, so it

usually happens that when the spring growth hardens up the aphids migrate in large numbers.

This usually happens about the middle of March. Until that time practically all the aphids which infest your trees will have been born in your own grove. Therefore keep the infestation down for the next seven weeks and you will reduce the probability of having severe trouble during the blooming period.

CITRUS SEEDLINGS; Cleopatra, Sour, Sweet, Rough Lemon, Grapefruit. Grand Island Nurseries, Eustis, Fla.

MANURE — Stable and Dairy Manure in car lots. Write for prices. P. O. Box 2022, Jacksonville, Fla.

ALYCE CLOVER SEED. Ripe and cleaned. Ideal cover and hay crop. Write for information. P. E. Snyder, Box 866, Lakeland, Fla.

CALIFORNIA CITRUS NURSERY TREES

Buy trees of known quality and percentage from California's largest Citrus Nursery. Lowest prices. Send for descriptive folder.

TETLEY NURSERIES
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CROTALARIA SPECTABILIS — Fresh crop, \$15.00 per 100 lbs. f. o. b. Frostproof, Fla. Milton Woodley, Frostproof, Fla.

CHOICE Rough Lemon Seedlings 6 to 20 inches high, \$10.00 per thousand. Olan Altman, Sebring, Florida.

CITRUS NURSERY TREES; Standard and new varieties. Low prices for Fall planting. Grand Island Nurseries, Eustis, Fla.

LARGE AND SMALL orange groves for sale also acreage suited for citrus culture, dairying and general farming. Charlton & Associates, Valuation Engineers and Real Estate Appraisers, Ft. Lauderdale, Fla.

CROTALARIA SPECTABILIS and Hay Peas. Write for our prices. We also have a full and complete line of all farm seeds. Robinson's Seed Warehouse, Cairo, Georgia.

"**MAIL ORDER** Operator desires contact with grower of high grade avocado pears. Have interesting proposition for grower of highest quality fruit." F. R. Gardner, P. O. Box 528, Greenville, Pa.

PLANT SOAR'S SWEET ORANGE trees for profit, fruit sells in September for \$1.12½ to \$1.50 per box, no losses from drops or frozen fruit, does not dry out on lemon. Pomona Nurseries, Dade City, Fla.

EMPLOYMENT WANTED — World War veteran. Citrus, landscaping and salesmen experience. 12 years last employer, college education. References. Box 384, Eustis, Fla.

FOR CITRUS NURSERY TREES not damaged by freeze see THOMPSON NURSERIES, Route 1, Box 181, Winter Haven, Fla.

40,000 CITRUS TREES For Sale — Selling out cheap. All standard varieties. A. M. Harvey, 818 South First St., Winter Haven, Fla.

SUPERIOR CITRUS TREES of principal varieties. Also limes, lemons and the best new varieties of tangos and avocados. Ward's Nursery, Avon Park, Florida.

GRAFTED AVOCADO TREES of leading varieties, priced low. R. B. Rosenthaler, Winter Haven, Fla.

CITRUS BUDS AND SEEDLINGS — Usual Standard Varieties on Sour Orange Stock, also Sour Orange Seedlings. Nursery at Blanton, Pasco County. For information and prices, write R. P. Thornton or H. S. Pollard, Copothorn Nurseries, Box 2880, Tampa, Florida.